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Today's Topics:

Date: 26 Oct 89 13:38:34 GMT
From: ncrlnk!pmday_2!steve@uunet.uu.net (Steve Bridges)
Subject: Aviation NAVAIDS (long, lonter now)

In article <8910260703.AA00903@ucbvax.Berkeley.EDU> MEHARP01@ULKYVM.BITNET (Michael Harpe) writes:
>
>Aviation NAVAIDS are some of the slicker applications of radio
>technology that you will ever find. Here is a brief core dump of what I
>know about them. My apologies if some of the actual technical info
>is incorrect or incomplete. My knowledge is mostly from the user view
>since my father is a retired air traffic controller. In that spirit,
>here's Mike's Little List of NAVAIDS:
>
>VOR - Stands for VHF Omni Ranging (I think). System uses a ground-based
>transmitter that sends a phase encoded signal that looks like a "radio
>compass" to the receiver. Pilot uses a receiver in the cockpit to home
>in on the VOR. There is a huge network of these transmitters around the
>country. They form the nodes of a large grid of aerial highways that
>are used for navigation. A typical transmission using a VOR may sound
>like "Cessna 27G, turn right heading 240 proceed direct MYSTIC." This
>instructs the pilot to turn onto heading 240 degrees and follow the
>signal from the MYSTIC VOR to the VOR. When he gets there, he will
>either receive further instructions or follow his flight plan. VOR's
>were one of the earliest NAVAIDS.

Yes, but there was a couple of earlier things. One was the
beacon system that used a narrow beam. One side of the beam you
heard dashes, and the other side dots.

One other navaid is the NDB. It is a non-directional beacon transmitting
in the AM band (up to 600 or so Khz). The aircraft has a loop-sense antenna
that points to the station. The receiver in the aircraft is called and ADF
and can also be used to pick up standard AM commercial broadcasts. Great
for listening when you don't have to talk to ATC

Actually, the VOR transmiitter has a rotating beacon that rotates through

360 degrees and somehow encodes the bearing into the signal. The receiver in the aircraft decodes this and indicates through the OBS (Omni-bearing selector) indicator how far left or right of the selected radial you are.

The drawback to VORs is that the closer you are to the station, the more sensitive the signal is, since the length of arc between any two angles is shorter closer in than farther out.

There are also 2 classes of VORs: Primary and secondary. Primary VORS are generally used to define the Victor Airways (low altitude) and jet airways (high altitude). Secondary VORs are generally used as part of an instrument approach. Something like:

"Cessna 737zz, proceed direct Midwest VOR, cleared for VOR-Alpha approach Greene County". What this means is that the pilot is cleared to the Midwest VOR, and then can execute the VOR-ALpha approach into the Greene County airport (it happens to be on the 334 deg radial, 18.5NM DME from the VOR).

>ILS - Instrument Landing System. System uses radio signals (I don't
>know what frequency, I think microwave) to generate a glide slope signal
>to landing aircraft. This allows a pilot to land an aircraft safely in
>marginal conditions. Most airliners use ILS even in clear weather
>because it's actually easier. The pilot just follows an indicator in
>the cockpit which indicates if his rate and angle of descent are
>correct. If you want to hear irritated pilots, catch your airfield with
>it's prime runway's ILS down! :-). Approach control will handle the
>aircraft until it reaches the "outer marker" of the ILS. This is the
>first indication received from the ILS. Generally approach will tell
>the aircraft to contact the tower at that point with "TWA 424, contact
>the tower 120.3 at the outer marker."

Actually, the ILS uses the same radios and indicators as a VOR, just that the ILS provides both glideslope and azimuth indications. It is in the same band as the ILS (the lower part of the nav frequencies are for landing aids, the upper part for VORS).

The ILS generally uses the number 1 OBS and has an extra indicator to indicate glide slope.

There are some variations on the ILS. One is the Localizer only where only azimuth information is given. Also something that can occur is the glideslope-only approach (generally with the localizer is out). One of the more interesting approaches is the localizer back-course approach. It is the same as a straight localizer approach, the the needle sensing in the cockpit is reversed.

Around Dayton, I have never flown an ILS from the IAP (intial approach

point), but have had "N737ZZ, expect vectors for ILS 24 RIGHT". You will then be vectored about to a point where the approach controller can fit you into the flow of traffic. Then at the outer marker (generally another NDB), you can expect "N737ZZ, contact Tower 119.1".

>DME - Distance Measuring Equipment. Related to VOR. Gives a dead
>reckoning distance to the NAVAID generating the signal. An optional
>addition to VOR's. Useful with a busy VOR or a remote one. If you have
>VOR and DME in your plane (not all do, it's not required) it's really
>difficult to get lost. Also nice when setting up for an approach.

Not all VORs have DME capability. The DME in the aircraft sends a signal to the DME at the VOR, and then it replies back. By timing these signals the DME in the aircraft can give a distance reading, compute groundspeed, and give an estimated time of arrival. You are right, it is great for an approach.

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Date: 26 Oct 89 16:49:00 GMT
From: silver!commgrp@iuvax.cs.indiana.edu
Subject: Earthquake in SF!!!

Hams in the San Francisco area apparently did a great job! I hope they get proper recognition. How did the cellular phone system perform during the earthquake emergency? In many big cities, it is barely adequate to handle normal rush-hour traffic. Did cell sites in SF stay on the air with emergency power? Did the yuppies save the day with their portable phones, or did high tech let them down?

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Frank W9MKV reid@gold.bacs.indiana.edu

Date: 26 Oct 89 16:47:00 GMT
From: silver!commgrp@iuvax.cs.indiana.edu
Subject: Looking for comments on ham demos

Patty Winter writes:

>Have any of you ever done amateur radio demonstrations for children
>(or other age groups) in institutions such as convalescent hospitals?

>It seems to me that such demos could really brighten the day of kids
>who are otherwise bored and maybe scared. I'm wondering what kind of
>demo someone in that situation might like: VHF or HF? Fancy stuff
>like autodialers, or ordinary chitchat? DXing or stateside?
> ...

A very important question! Kids (the future of ham radio) are darned hard to impress!

Fifteen years ago it was easier; demonstrate satellite communication, autopatch, lasers. Today every hillbilly has a satellite dish, every yuppie has a cellular phone, and every grocery store has lasers. A portable packet rig _might_ be good, but lots of kids are already BBS wizards.

Kids adapt to `high tech' faster than adults, but can be intimidated if they feel that understanding of such things is unattainable, so not worth attempting. Their defensive reaction is often "Big deal; so what?" They are certainly unimpressed by anything which they feel their parents' generation dominates and has exhausted all the possibilities. (I don't blame them for sneering at typical ham appliance-operator activities!) On the other hand, they are fascinated by opportunities to gain knowledge their parents lack, which by definition gives them more control over their environment (which they desperately desire). I've seen their faces light up when they comprehend basic electricity, or what a transistor does, and realize the power of that knowledge.

After having my beloved ham gear disparaged by the little twerps, I discovered that a low-end approach to electronics is much more successful. Variations on the following demonstrations have been well-received by brighter-than-average kids aged 10-14:

1. Remember that they probably don't understand how a flashlight works. Demonstrate electric shock: Connect a few 9v batteries in series, enough to feel with wet fingers. Use kids holding hands to demonstrate series circuits. Demonstrate again using battery, lightbulb and switch. Let them play with it for a while.

2. Keep their interest by skipping the rest of the basics for now. They love visual demonstrations: Show them how an oscilloscope works like an "Etch-a-Sketch" (tm), then connect a flashlight cell to show

how it reacts to voltage. Next, connect an oscillator (also connected to a speaker) to the scope. Starting at 1 Hz, show how the scope makes a graph and how frequency, wavelength and pitch are related. Then connect a microphone to the scope; whistle and talk into it. Pause to let them explore the mysterious scope knobs. (Oscilloscopes are _cool_; every mad scientist has one in his laBORatory! :-)

2. Connect a silicon photocell to the oscilloscope; demonstrate its response to a flashlight and to 60-Hz fluorescents. Then connect it to a transistor (which you salvage from an old p-c board). Connect the scope to the collector. Substitute a relay or lightbulb for the collector resistor. ("You now know how to build an intrusion detector for your room...")

3. Using the same transistor, connect a crystal set to the input, thereby building a radio from scratch. When I saw that done at age 10, I was profoundly impressed; I had a wonderful feeling that maybe the world is still young and that electronics might be within my capabilities. The gain of self esteem was priceless. My electronics career started there. (BTW, the crystal set in the Boy Scouts' Handbook does not work because the sliding coil-tap shorts turns.)

4. Demonstrate telephones built from earphones, batteries, speakers, etc. Provide enough supplies for the kids to build their own. Suggest that they start their own neighborhood phone company. Mention that they could have some real fun by connecting an amplifier to the system.

5. Explain that ham radio is a fun, easy way to learn electronics. THEN demonstrate ham radio's capabilities. Distribute books on basic electricity, and electronic junk to dismantle for parts.

A local chemistry prof who is a scoutmaster has "junk night" for his troop once a year; he collects discarded electromechanical devices, then provides tools and lets the scouts wreck the stuff and keep the interesting and useful components (magnets, lenses, etc.) Junk night is held in a lab which contains oscilloscopes, meters, etc. Selected local hams are invited to help and supervise. It's great fun for everybody.

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Date: 26 Oct 89 16:23:31 GMT

From: sun-barr!newstop!suntops!santa_fe.Tops.Sun.COM!aga@apple.com (Tony Angerame)
Subject: Neutralizing Heathkit finals (6146/A/B woes)

How about the old fashioned method of removing hv and screen voltage leaving the filaments on if I remember correctly, applying drive and dipping the output as detected on a sensitive relative power meter? The object here to neutralize the interelectrode capacitance of the tube with a variable and equal parrellel capacity. Start on 80 meters and work your way up to 10, 10 being the most critical. Also please do be carefull with the dangling plate and screen leads.

Date: 26 Oct 89 17:39:41 GMT
From: gem.mps.ohio-state.edu!ginosko!aplcen!stda.jhuapl.edu!mjj@tut.cis.ohio-state.edu (Marshall Jose)
Subject: Neutralizing Heathkit finals (6146/A/B woes); also GE tubes

Well, I did some more messing around, and finally concluded that the total neutralization capacitance (intended and stray) exceeds the Cgp of the tubes. There's every indication that, with these tubes, Heath's neutralization cap is too large (!). In fact, when it's disconnected, the STRAY capacitance is too high! Now, that's only my preliminary conclusion, but I didn't have any more time to spend on it, so:

I left the neutralization trimmer cap disconnected, and verified that there was no parasitic oscillation on any band, at full power and reduced power. I did have to monkey with the driver neutralization wire (how cheesy!) to get everything to work happily. Then I packed it up and returned it to its owner, sheepishly. Feh.

In other news, gents: While we're on the topic of 6146s, I thought I might repeat a caveat no doubt heard earlier here, which is:

Don't use GE 6146W tubes in your Heath/Kenwood/other rigs!!!
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Now that I have your attention: GE made a run of 6146-type tubes for a gov't contract. They made them according to the spec, which included a filament voltage of 6.8V (not 6.3). Consequently, when Joe ham pops 'em in his rig, he finds they don't put out due to decreased thermionic emission. These tubes are showing up at hamfests. DON'T BUY THEM! You have been warned.

Now, go out & have a nice day. Right.
Marshall Jose WA3VPZ
mjj@aplvax.jhuapl.edu || ...mimsy!aplcen!aplvax!mjj

Date: 26 Oct 89 01:08:44 GMT
From: sun-barr!newstop!texsun!pollux!attctc!netdev!root@apple.com (Alex Huppenthal)
Subject: Novice - Tech - General Class

A few months ago, I posted a note asking for information on how to train for and receive Novice - Technician and finally (for me, for now) General Class FCC License.

We lost a disk here that the responses. If it isn't too much trouble, could someone E-mail some information on how next to proceed?

I just purchased Gordon West's "General Class FCC Preparation", without knowing that I needed to take the Novice and Technician tests first.

My questions are:

    How many months of study are needed for each class ticket - on average?

    Where do you take the test around North Dallas, TX?

Thanks in advance,

-Alex

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Communication Systems Research   (If I had 32MB of real memory,   )
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End of INFO-HAMS Digest V89 Issue #808
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